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Engineering Division
Integrated Safety Management Plan

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The Laboratory's EH&S policies and requirements are contained in the RPM, PUB-3000 and the Operating and Assurance Plan (OAP). This Integrated Safety Management Plan document explains what mechanisms will be maintained in the Engineering Division to assure the safety policies and requirements are properly implemented.

The Engineering Division is organized into six line departments. These departments provide specific resources and support activities for the Laboratory's Research Programs. Department heads report directly to the Division Director, James Triplett, and are responsible for supporting scientific excellence, maintaining relevance to the DOE mission, assuring fiscal integrity of their departments and doing so in a safe manner. The Division also has approximately 20 group leaders who ensure their local activities are conducted safely, efficiently, and effectively. Group leaders report directly to their respective department heads and or project leaders. The Division Safety Coordinator, Weyland Wong, is charged with oversight pertaining to Environment, Safety, and Health (ES&H) matters and reports directly to the Engineering Division Director. The Division ES&H Committee (chaired by the Division Director) is composed of senior manager representatives from each department. Committee meetings are held at least four times per year to review the Divisions safety program and performance, advise on corrective actions plans to achieve better safety performance, follow through by promoting ES&H awareness, training, and practices in their respective departments to meet or exceed the Division's annual ES&H goals. The Engineering Division Director is responsible for overall leadership of the ES&H Program.

SCOPE OF WORK

Mission

The Engineering Division provides engineering and technical resources to contribute to the scientific and technical achievement of the Laboratory's research and development programs. We are committed to remain in a leadership position in areas critical to future Laboratory needs. Our mission is carried out by:

- Organizing the Division into customer-focused departments;
- Matrixing professional and technical staff directly to research divisions to work as contributing team members of the research and development projects;
- Forming collaborations in new LBNL scientific program areas with traditional and new partners in Laboratory divisions, UC Berkeley, and industry;
- Developing and sustaining relevant, unique and specialized capabilities, facilities and people to enhance existing Laboratory programs;
- Advancing technology through engineering research and development compatible with the overall Laboratory mission;
- Maintaining competitiveness with similar research and development institutions by attracting outstanding talent, practicing effective staff and personnel management, and through participation in new technology-development projects;
- Ensuring competent staff are available for initiation of new programs through effective management of resources, continuing our successful program of internships for bright, new graduates and through our outside engineering services contract;
- Developing and sustaining specialized-design tools and capabilities, such as CAD/CAE/CAM, custom integrated circuit design, and the Design Works Group.

In addition, the Engineering Division conducts independent applied research and development in areas related to its engineering competencies.

DEVELOPMENT OF INTEGRATED SAFETY MANAGEMENT PLAN

The Engineering Division accepts and supports the Laboratory's Integrated Safety Management System's (ISMS) Five Core ES&H Functions and Seven Guiding Principles by having developed and implemented this Integrated Safety Management Plan. This plan describes how each principle will be accomplished while adhering to the Laboratory's ES&H policies and regulatory requirements. Using additional information from the Division's Management of Environmental Safety and Health (MESH) Review dated June 2001, Integrated Hazard Appraisal (IHA) dated September 4, 1996, Integrated Functional Appraisals (IFA) dated June 1998 and October 2001, and the results of the annual Self-Assessment Reports, corrective actions and improvements in safety management will continuously be improved and further integrated into the Division's mission of providing quality engineering and technical resources to support the research and development programs of the Laboratory.

FIVE CORE FUNCTIONS

1. Work Planning

The clear definition of the tasks that are to be accomplished as part of any given activity.
Example: Define Scope of Work means to (1) translate mission into work, (2) set expectations, and (3) prioritize tasks and allocate resources.

2. Hazard and Risk Analysis

The analysis and determination of hazards and risks associated with any activity, in particular risks to employees, the public, and the environment.
Example: Analyze Hazards means to (1) identify and analyze hazards and (2) categorize hazards.

3. Establishment of Controls

The controls sufficient to reduce to acceptable levels the risks associated with any activity. Acceptable levels are determined by responsible line management, but are always in conformance with all applicable laws and Work Smart Standards.
Example: Develop/Implement Controls means to (1) identify standards and requirements, (2) identify controls to prevent/mitigate hazards, (3) establish safety envelope, and (4) implement controls

4. Work Performance

Conducting tasks to accomplish the activity in accordance with the established safety controls.
Example: perform work means to (1) confirm readiness and (2) perform work safely.

5. Feedback and Improvement

Implementation of continuous improvement for an activity, including incorporation of employee suggestions, Lessons Learned, and employee and community outreach, as appropriate. Example: Feedback and Improvement means to (1) collect feedback information, (2) identify improvement opportunities, and (3) make changes to improve current and future similar tasks.

Validation Measures

Validation Measures are key elements of this Integrated Safety Management Plan. During the Validation Phase, Performance Based criteria will be used to evaluate system effectiveness in the following areas (**metrics**): hazard analysis, staff accountability, Division ES&H Committee, Self-Assessment Program, Work Authorizations, Qualifications and Training, and resource allocations toward ES&H requirements. The Engineering Division will continue to be proactive in implementing its continuous improvement of its ES&H program.

SEVEN GUIDING PRINCIPLES

Principle 1: Line Management Responsibility for ES&H

Division line management (department heads, project managers, group leaders, and supervisors) is responsible for the protection of the public, the workers, and the environment; or "The line manager is the person who has the responsibility, and the authority for getting the job done safely." More specifically, Division line managers are responsible for the integration of ES&H into the work and for ensuring active, rigorous communication up and down the management chain and with the workforce. Part of the group leader's job is to communicate the organization needs to the supervisors and employees and communicate the employee's needs to the organization. However, it is also the responsibility of all Engineering employees (staff, guests and students) to observe and practice safety at all times when carrying out their assigned duties.

Principle 2. Accountability and Responsibility

To ensure ES&H at all organizational levels within the Division and for work performed by its contractors, the Engineering Division has established and maintained clear and unambiguous lines of authority and responsibility:

The Division Director has overall safety responsibility for Engineering Division staff, the work they perform, and the Division's space and facilities. The Division Director is the chair of the Division ES&H Committee and the Division Accident Review Board.

Department Heads, Managers, Project Leaders, Group Leaders, and Supervisors have associated responsibility at the local level to identify hazards, allocate the appropriate resources, implement controls, insure work is being performed safely and increase general employee awareness of workplace ES&H expectations, issues & successes. The informal authorization process is performed by these individuals. This accountability is entrusted to these individuals to carry out safely, efficiently, effectively and professionally. (Reference to the EHS0020 – ES&H for Supervisors and Managers)

Engineering Division Safety Coordinator coordinates the Division Safety Program. This includes oversight of the division self assessment program (formal documentation of safety deficiencies and corrective actions), formal authorizations, accident investigations, division safety committee and accident review board facilitator, waste management programs, safety training statistics, Job Hazards Questionnaire statistics and safety communications.

Principal Investigators are responsible and accountable to the Division Director for assuring that all activities are carried out in a safe manner, and in accordance with all Laboratory ES&H requirements. This responsibility and accountability cannot be delegated. Principal investigators must consult with qualified specialists (e.g., Division ES&H Coordinators and EH&S Division staff) to resolve any questions about ES&H requirements. They are expected to incorporate the Laboratory's ISMS seven principles into the management of their work activities. While these principles apply to all work, the exact implementation is flexible and can be tailored to the complexity of the work and the severity of the hazards and environmental risks.

Building Management: The Engineering Division is responsible for the following buildings: 25 and 77 complexes, 44, 44B, parts of 46, 62, 80, 50A, 70A and 84 complexes. Building Managers are in place for all majority spaces and facilities for which the Division is responsible. These Building Managers perform the functions and duties described in *LBL Building Manager Policy and Procedures*.

In addition, a Building Responsible Person (BRP) is appointed to coordinate self-assessment activities and corrective actions of safety matters in her/his building. The BRP always accompanies appraisal teams during building inspections.

Each building has a Building Emergency Team consisting of the Building Manager, Deputy Building Manager, and Assistant Building Managers. Team members are responsible for assisting persons to safety during both real emergencies and emergency exercises as described in PUB-527.

Engineering employees are responsible for knowing and following the ES&H requirements that apply to their work. They are expected to work safely, to determine and understand which ES&H requirements apply to their work when carrying out the Division's mission. Furthermore, LBNL RPM §7.01 Health and Safety B- Responsibilities states "As a condition of employment, every employee, visiting scientist, student, or other person performing work at the Laboratory or one of the Laboratory's off-site locations must be familiar with and implement applicable Laboratory safety standards. This responsibility includes taking the initiative to consult with resource groups when assistance or advice is needed to carry out operations safely. See PUB-3000 Chapter 1 (General Policy and Responsibilities)."

Specifics on Matrix Personnel, Safety of Off-Site Workers and Students are found in Appendices A, B & C.

If there is any question about safety or environmental impact of an activity, individuals must stop and resolve the issue before proceeding.

The Division has created an accident review board consisting of the Division Director and Division Deputy, Department and senior managers Division EH&S Liaison, and Division Safety Coordinator. The board reviews each division DOE recordable injury as well as other significant accidents and injuries. The supervisor and employee discuss the event with the accident review board, including the conditions, the planned activity, cause of the accident, corrective actions and future measures that will enable safe job performance for themselves and others. Lessons learned and other feedback mechanisms are communicated to the Division staff when appropriate.

Principle 3: Competencies Commensurate with Responsibilities

Line management and the Department of Human Resources review job/position descriptions and assignments (including new hires). Job requirements and responsibilities are matched with experience, knowledge, skills and abilities of individuals selected for assignment. They will determine the requisite qualifications to function safely, and will insure that the employee possesses these qualifications. Qualifications include skills, knowledge, training and certifications required by law or by Berkeley Lab policy. Until such qualifications have been established, individuals will only be allowed to work under the close leadership and guidance of a qualified employee.

The Division Safety Coordinator ensures that personnel who possess the experience, knowledge, skills, and abilities necessary to discharge their responsibilities conduct Self-Assessment activities. They have applicable background when possible and receive training in the area of their assigned specialty group, including general inspection procedures and protocols. Members are identified in the Engineering Division's ES&H web page under Information, Self Assessment, Team Members.

Division management ensures that appropriate depth and breadth of technical experience in ES&H is available throughout the organization and that the Division has in place the means for evaluating employee competencies such as training, experience, and fitness for duty. It is a Division requirement that during the annual Performance/Progress Review, supervisors and employees also review Job Hazardous Questionnaires and Training Profiles to evaluate and update ES&H training requirements relative to duty assignments.

Principle 4: Balanced Priorities.

To facilitate implementation and execution of this Division ES&H Program, the following resources are allocated to address ES&H, programmatic, and operational considerations. Protecting the public, workers, and the environment continues to be a priority whenever activities are planned and performed to accomplish the Division's mission.

Division allocations for FY2003:

1.00 FTE for Division ES&H Coordinator,
0.50 FTE for administrative ES&H support
0.50 FTE for Self-Assessment Program (inspection, documentation and effort for corrections)
0.50 FTE approximately for required safety training and safety meetings at central locations
In addition funding is provided for personal protective equipment, supplies and equipment procurement.

The EH&S Division will provide resources on a matrix basis to assist the Engineering Division staff in the implementation of this Plan:

0.50 FTE Division assigned Liaison/Safety Engineer
0.25 FTE other EH&S Division Staff

Principle 5: Identification of ES&H Standards, Requirements, and Validation

Before work is performed, the associated hazards are evaluated and the applicable safety standards and requirements are correlated with the Laboratory's Safety and Health Manual Publication 3000. When properly implemented, protection from adverse consequences is provided to the public, employees, and the environment. Standards and hazard identification and protection are provided through periodic reviews using:

- Work Smart standards (WSS)
- Results of Self-Assessment roll-ups
- Results of planned EH&S Division reviews
- Results and recommendations of the LBNL MESH appraisals by the SRC
- Results and recommendations of LBNL IFA's by EH&S
- Department of Energy (DOE) operational Awareness and for cause reviews
- East Bay Municipal Utility District (EBMUD), City of Berkeley, Bay Area Air Quality Management District (BAAQMD), and other independent and/or external reviews

Principle 6: Hazard Controls Tailored to Work Being Performed

Administrative and engineering controls to prevent and mitigate hazards are tailored to the work being performed, as well as potential associated hazards. The Engineering Division recognizes that tailoring requires judgment to be exercised at the appropriate decision level. Engineering will ensure that ES&H analysis, planning, preparation, implementation, reviews and improvements are a part of every aspect of work the Division conducts, at the division, department, program, project, facility and activity levels. Subject matter expertise resources from the EH&S Division is readily available to assist in all aspects of our hazards control program.

Appropriate resource allocation for ES&H concerns in all work is to include provisions for safety training, equipment and supplies, permits, maintenance, waste disposal, and facilities modifications.

An overall *SAFETY GOAL* is to build ES&H awareness and consciousness among all employees to enable them to fulfill their responsibility for knowing and following applicable ES&H requirements. This includes awareness of unsafe or unhealthy workplace conditions, recognizing practices that have potential personnel and environmental impacts, encouraging feedback, and initiating corrective actions to protect.

Principle 7: Operations Authorization

Conditions and requirements to be initiated, conducted and satisfied for safe operations are clearly established in Chapter 6 of PUB 3000. It outlines a method for ensuring the form and content of informal and formal safety authorizations. The Principal Investigators in the Engineering Division will prepare the appropriate documentation and obtain all required authorizations and permits for potentially hazardous or regulated work prior to commencement of the work. Annually, the Principal Investigators and Division Safety Coordinator in cooperation with the EH&S Division, will review and update formal authorizations. Work or equipment outside the scope of an existing authorization will be brought forth by the principal investigator to the attention of the EH&S Division prior to commencement or continuance of hazardous work activity.

The Lab-wide Hazards, Equipment, Authorizations and Review (HEAR) system associated with the Work Smart Standards initiative and subsequent IFA list the workplace hazards intrinsic to each Laboratory space/location. Authorization reviews and corresponding hazards should be recorded in the HEAR database.

Appendix A

Matrix Personnel

A significant number of Engineering Division staff are “matrixed” to other groups. A person is considered "matrix" if the person has a "home" division or department from which he/she is assigned from to work exclusively in a "host" division or department which provides daily work instructions and oversight. For example, personnel from other groups like ASD are matrixed to Engineering.

Persons performing short-term tasks for another division without being assigned a host supervisor, such as Facilities personnel responding to Work Requests or Engineering Division technicians working on AFRD components in the Bldg. 77 shop, are not considered matrix personnel. The safety of these workers remains the primary responsibility of the home division. Engineering personnel requesting work from another division are expected to inform the assigned workers of any unusual hazards or safety precautions associated with the work.

Supervisors are always responsible for maintaining the safety of the workspaces under their control. All Laboratory personnel are responsible for stopping any work activities they observe that appear to be an imminent danger, regardless of the status of the persons performing the work.

The safety of matrix personnel from other divisions working for Engineering is the primary responsibility of their host supervisor. The safety of Engineering personnel matrixed to other divisions remains the responsibility of Engineering unless otherwise specified in a Memorandum of Understanding established with the host division. Before work begins, the host supervisor, home division supervisor, and matrix person are to communicate with each other about job hazards, ES&H training requirements, and establish performance expectations for the work to be done safely in the matrix assignment.

The Job Hazard Questionnaire and ES&H Training Profile for people who are matrixed to or from Engineering should be reviewed and acknowledged by the matrix person, the host supervisor, and the home supervisor. The Engineering Division supervisor is responsible for monitoring the completion of required ES&H training of their matrixed person as indicated by the JHQ. Host supervisors may require specific or unique training for matrix personnel assigned to their unit, and may provide on-the-job ES&H training specific to the assignment. The host division funds any ES&H training the host supervisor requires matrixed personnel to complete for their assignment. Matrix personnel (as with all staff) must be under the close leadership and guidance of a qualified employee until required safety training for their assignment has been completed.

For engineering design work, it is the responsibility of the originating or approving engineer to ensure that design documents are processed in accordance with Engineering Division safety procedures.

Matrix personnel will participate in host division self-assessment activities as described by the host division ISM Plans. The host division ES&H Coordinators can invite the home division ES&H Coordinator to participate in joint site walkthroughs of workspaces of matrix personnel.

"Occurrences" related to matrix assignments are reported by the division whose operations are most affected, as determined by the host and home Division Directors. Home and host division personnel and EH&S Liaisons will assist in the Occurrence investigation, reporting, and corrective actions as requested by the reporting Division Director.

The Engineering Division supervisor retains primary responsibility for completing the Supervisor's Accident Analysis Report (SAAR) for accidents/injuries involving their personnel, including those who are matrixed to other divisions. This is performed in accordance with the division's Injury Follow-up Process (http://engineering.lbl.gov/esh/documents/injuryfollowup.pdf).

Appendix B

Safety of Off-site Workers

The Engineering Division recognizes the LBNL ISM system generally applies to all LBNL personnel working anywhere, any time (including while they are on travel and/or working while performing field work on matrix assignments). There may be local requirements governing specific work standards, but the Engineering Division exercises its line management responsibility and matrix staff protocols to assure that these off-site workers are working safely. Specifically for work on the UC Berkeley campus, there is a Memorandum of Understanding in effect governing how EH&S activities will take place between UCB and LBNL. While specific standards in effect for the UCB campus may differ somewhat from the equivalent requirements at LBNL, the Engineering Division's responsibility to assure that LBNL work performed at UCB (exclusive of Donner and Calvin where our ISM system applies) is performed safely and in accordance with those local standards.

Insuring the safety of the large number of matrixed Engineering staff participating in their assignments at the Berkeley Lab is to be a routine activity and responsibility.

Appendix C

Safety of Students

The Engineering Division recognizes the LBNL ISM system does not make a distinction between students and any other type of LBNL-associated personnel. Generally, if students are compensated then they are considered employees, and if they are not compensated they are considered guests. The contract between DOE and the University of California for operation of LBNL directs LBNL to assure safety in its operations "… regardless of the performer of the work". Students are to be afforded the same safety protections, and in turn have the same safety obligations, as any other LBNL personnel. The goals, strategies and guidance stated in the Engineering Division ISM Plan are equally applicable to students working on activities under the auspices of the Engineering Division. In addition to assuring the safety of student employees, the Berkeley Lab wants to instill in student employees an understanding of the safety requirements and processes they will encounter throughout their careers following graduation. Student will follow all applicable Berkeley Lab safety requirements. In case of doubt, the Student will consult with the mentor/supervisor before proceeding. Based on the work the student will perform, the mentor/supervisor and the student will complete a Job Hazard Questionnaire (JHQ) as soon as possible following completion of the New Employee Orientation (EHS 010). Until required safety training identified through the JHQ process or otherwise is completed, the student may perform corresponding tasks only under close supervision of the mentor/supervisor, i.e., with the full knowledge of the mentor/supervisor and while in the same room or area. The mentor/supervisor will not assign any task to the student until the mentor/supervisor has verified that the student has the knowledge, skills and physical ability to perform the task safely. At a minimum, this will involve an initial safety orientation to the student's work area and work assignments by the mentor/supervisor. The mentor/supervisor will provide appropriate safety supervision for the student throughout the student's stay at the Berkeley Lab. The mentor may delegate safety oversight as needed to qualified employees. Safety is an overriding consideration for all work involving student participants at the Berkeley Lab.